

6 melanic *Euphydryas aurinia* Rott., 6 unusual aberrations of *Melitaea athalia* Rott. and an extreme striated under side of *Polyommatus icarus* Rott., 45 aberrations of Heterocera from the Milman collection including the type of *Leucania l-album* ab. *o-album* Milman, and the only recorded *Hypena obesalis* Hbn., 36 *Gonodontis bidentata* including the type and allotype of ab. *bowateri* Ckyne. and the others figured *Ent. Rec.*, 1952, Pl. 14. 20 aberrations of *Rhopalocera* including an albino *Argynnis euphrosyne* L., an albino *Coenonympha pamphilus* L., extreme rayed under side of *Lysandra bellargus* Rott., gynandromorph *Strymon pruni* L., gynandromorph *Thecla betulae* L., and the type of *Aglais urticae* ab. *subtusornata* Reuss., 8 aberrant *Heterocera* including an albino *Polychrisia moneta* F. and a *Leucania loreyi* Dup., the type of *Saturnia pavonia* ab. *flaviocellatus* Wild, 4 *Melanargia galathea* ab. *mosleyi* Oberth., 27 aberrations of Macrolepidoptera including a gynandromorph *Trichiura crataegi* L., 2 *Mesoleuca albicillata* L. abs., 1 *Calothysanis amata* L. ab., 1 *Epirrhoe alternata* Müll. remarkable ab., 1 *Itame wauaria* L. melanic, 2 *Sphinx ligustri* ab. *lutescens* Tutt, 9 aberrations of *Arctia caja* L., 1 melanic *Drymonia dodonaea* Hbn. ♂.

A Breeding Experiment by Alfred Hedges with *Lygris testata* Linnaeus and its Recessive Mutant ab. *hedgesaria*

By E. A. COCKAYNE, D.M., F.R.C.P.

Lygris testata Linnaeus ab. **hedgesaria** ab. nov.

The ground colour in both sexes is a uniform orange; on the upper side of the fore wing of the male this is overlaid with glossy leaden grey especially towards the termen and in the darkest specimen it extends all over the wing; in others a streak of orange near the costa, another across the median area, and a third near the inner margin remains. The hind wing is not so dark as the fore wing but dark enough to make the normal dark border almost invisible. In the female the leaden overlay tends to be less extensive and not so dark. In both sexes the normal white markings are absent and the variegated appearance is lost. The under side of both fore and hind wings is very dark. The head, thorax, and abdomen are also darkened, especially the ventral surface of the abdomen. In brood 2/52 there are a male and female with no leaden overlay and a paler orange ground but the white markings are absent and the colour on both surfaces is very uniform so that they are sharply differentiated from normal specimens.

Type ♂: Ham Street, Kent. F4 3/52 bred by E. A. Cockayne.

Allotype ♀: same data: paratypes ♂ and ♀ F3. brood 2, ♂ and ♀ F4, ♂ and ♀ F4 2/52 both pale. ♂ basal marking asymmetrical 2/52 F4 bred E. A. Cockayne, ♂ under side F4 3/52 bred E. A. Cockayne. All from Ham Street, Kent (A. Hedges's stock).

Of the *testata* figured on Plate VII, figs. 1 and 2 are heterozygotes from a pairing between a male *hedgesaria* and a normal female, both F4 gen., and are apparently normal, but rather lighter than the average wild specimens from Ham Street. Fig. 5 is a male of F3 gen. brood 2, in which *hedgesaria* first appeared, and shows the three orange streaks

running from the orange base along the costa, the inner margin, and into the median area respectively, the darker outer part of the wing being overlaid with leaden grey. Fig. 3 is a male of the F4 gen. brood 3/52 darker than any of the F3 gen. and almost completely overlaid with leaden grey. It was bred from one of the newly hatched larvae given to me by Mr. Hedges. It is possible that the paler colour of most of those of broods 3/52 and 2/52 bred by Mr Hedges himself is due to the fact that he kept them very warm and forced them to emerge before he came to England giving them insufficient time to lay down their full complement of pigment in the pupal stage. Figs. 9 and 10 are specimens of F4 gen. brood 2/52 and have no leaden overlay at all. I bred none like them from my part of the same brood. Their pupal development may have been so rapid that they had no time to lay down any leaden pigment at all.

Light patches in the outer border especially noticeable in Fig. 11 are caused by the reflection of light from the somewhat metallic surface. In reality the border is uniformly dark.

A wild ♀ taken at Ham Street, ix.1949, gave a brood F1 of about 50, all normal, v-vi.1950.

F2 one pairing, brother and sister, gave a brood, all normal, 1951.

F3 Two brother-sister pairings taken gave in 1952

(Brood 1) 31, all normal.

(Brood 2) 28, 21 normal: 7 (4♂, 3 ♀) mutants.

Three brother-sister pairings taken gave

F4 (Brood 1/52) ♂ mutant of brood 2 × ♀ normal of brood 1.

(Brood 2/52) the same ♂ mutant × ♀ mutant of brood 2.

(Brood 3/52) ♂ mutant × ♀ mutant, both of brood 2.

F4 Brood 1/52 gave 42 all normal and rather lighter than average 1953

Brood 2/52 gave 45 (29♂, 16♀), all mutants.

Brood 3/52 gave 40 (23♂, 17♀), all mutants.

From newly-emerged larvae given to me by Mr. Hedges I bred 10 (4♂, 6♀) of the 45 in brood 2/52, and 9 (3♂, 6♀) of the 40 in brood 3/52. Eggs from three pairings of F4 mutants were all infertile.

Clearly the mutant *ab. hedgesaria* is recessive to the normal and is determined by a single autosomal gene, i.e. a simple recessive. The original wild ♀ must have been a heterozygote and the pairing that gave F2 must have been between a heterozygote and a homozygous normal, DR × DD. The pairings taken in 1952 that gave the F3 broods were brood 1, DD × DD, and brood 2, DR × DR, and the expectation in the first was all normal as actually happened and in the second was 3 normal: 1 mutant, the actual result being 21 normal: 7 (4♂, 3♀) mutant = 21 DD and DR: 7 RR.

In broods 2/52 and 3/52 the expectation was all mutants and the actual result was all mutants, RR. Even without the other pairings that might have been taken there can be no doubt about the interpretation of the results.

Mr. Hedges says that he bred from the original female because it was the only one he took in 1949 and he persevered with his inbreeding because of his success with *Manx testata* which led to his breeding *ab. contraria* Heydemann with its broad white band on either side of the median band. Most breeders would have given up the experiment when they saw no change in the F2 generation, but Mr. Hedges seems to be guided by some remarkable intuition to take the correct pairings.

I do not think this mutant is the same as the one occurring not rarely in the north of England and in Scotland in the purplish subspecies *insulicola* Stdgr., which, I believe, is ab. *obscura* Bretschneider. Orange females of this aberration occur occasionally just as ordinary orange females occur in this subspecies apparently as a recessive to purple. I think ab. *hedgesaria* is rare. In spite of the amount of collecting done in Ham Street I have not heard of the capture of a wild one.

EXPLANATION OF PLATE VII.

- Fig. 1. *Lygris testata* normal ♂. F4 1/52.
Fig. 2. Normal ♀. F4 1/52.
Fig. 3. Ab. *hedgesaria* ♂. F4 3/52. Type.
Fig. 4. Ab. *hedgesaria* ♀. F4 3/52. Allotype.
Fig. 5. ♂ F3 brood 2.
Fig. 6. ♀ F3 brood 2.
Figs. 7, 8. ♂ and ♀ F4.
Figs. 9, 10. ♂ and ♀ pale form. F4 2/52.
Fig. 11. ♂ Basal lines asymmetrical. F4 2/52.
Fig. 12. ♂ underside. F4 3/52.
Figs. 5-12. Paratypes.
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The Life History of *Thaumetopoea jordana* Staudinger

By TREVOR TROUGHT, M.A.

On taking up residence in the Jordan Valley on 23rd October 1951, among the first moths to be caught at light that evening were specimens of the male of this species, then unidentified.

The locality is a bluff above the Zerqa River (the Biblical "Jabbok River") where the river gorge opens out into the Jordan Valley plain. The Zerqa River delta is an irrigated and cultivated area, and has been such from time immemorial. I have named the cluster of diverse dwellings on this bluff, which is about 100 metres below sea level, the Zerqa River Colony. It is the residential headquarters of the Jordan Government's Department of Land and Surveys Irrigation Section. The offices are in the Valley 100 metres below. Between the houses and the offices a footpath runs down a wadi (or valley) which I have christened "Simansky's Wadi" after Mr. Simansky, the irrigation expert.

The lighted windows of the house proved attractive to moths. Many *Th. jordana* males were attracted and, after a series had been taken, were ignored.

An interesting record is that on 4.xi.51 a female was captured at light *in cop*. The import of this was not realised till too late, but in the event, it did not matter.

On 26th December 1951 my wife found a clump of caterpillars, about sixty in number, on a sumach bush (*Rhus tripartita* D.C.) in a small wadi about half a mile from the Colony. Later, numerous other clumps were found on sumach bushes in Simansky's Wadi at about 150 metres below sea level. Although many bushes were examined outside this wadi during the season, only two clumps, including the one found on 26th December, were found away from, though not far from, this wadi, which is clearly the breeding centre for this locality.